Electronic Version
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Claims

[c1] What is claimed is:

1.An oil delivery system comprising:

an oil pump rated to operate within a prescribed voltage range and configured to deliver oil to an internal combustion engine;

a voltage source having an output voltage outside the prescribed voltage range of the oil pump; and

a control connected to the oil pump to operate the oil pump at the output voltage outside the prescribed voltage range.

[c2] 2.The oil delivery system of claim 1 further comprising an oil pump drive circuit connected to the control and the oil pump to limit current to the oil pump.

[c3] 3.The oil delivery system of claim 2 wherein the oil pump drive circuit is controlled by the control to limit current to the oil pump at approximately one ampere during engine operation.

[c4] 4.The oil delivery system of claim 2 wherein the oil pump drive circuit includes a voltage comparator configured to compare the output voltage of the voltage source to a

reference voltage and having an output to deactivate the oil pump when the output voltage exceeds the reference voltage by a threshold amount.

[c5] 5.The oil delivery system of claim 4 wherein the voltage comparator is further configured to have an output to allow continued operation of the oil pump if a difference between the output voltage and the reference voltage is less than or equal to the threshold amount.

[c6] 6.The oil delivery system of claim 1 wherein the oil pump is rated to operate at a nominal 24 volts.

[c7] 7.The oil delivery system of claim 6 wherein the voltage source is configured to provide a rail voltage of 60 volts.

[c8] 8.The oil delivery system of claim 1 wherein the prescribed range is 24 to 30 volts.

[c9] 9.The oil delivery system of claim 1 wherein the internal combustion engine is a two-cycle engine.

[c10] 10.The oil delivery system of claim 1 wherein the internal combustion engine is configured to provide thrust for a watercraft.

[c11] 11.The oil delivery system of claim 1 wherein the oil pump is electrically connected directly to the voltage source.

[c12] 12.The oil delivery system of claim 1 wherein the voltage source includes an alternator capable of producing voltages in excess of 30 volts.

[c13] 13.The oil delivery system of claim 1 wherein the voltage source is further configured to output voltages within the prescribed voltage range to the oil pump in addition to the voltage output outside the prescribed voltage range.

[c14] 14.A control unit comprising:
a drive circuit connected to an engine component rated to operate at a prescribed amperage with a prescribed voltage, the engine component connected to a voltage rail capable of having a rail voltage greater than the prescribed voltage;
a voltage sensing circuit connected to measure the rail voltage; and
a control circuit connected to the voltage sensing circuit and the drive circuit to control the drive circuit to maintain operation of the engine component at approximately the prescribed amperage based on a difference of the prescribed voltage and the rail voltage.

[c15] 15.The control unit of claim 14 wherein the drive circuit is further configured to deactivate the oil pump if current

through the oil pump is greater than the prescribed amperage.

[c16] 16.The control unit of claim 14 wherein the control circuit is further configured to compare the rail voltage to the prescribed voltage and determine switching of the oil pump between ON and OFF states therefrom.

[c17] 17.The control unit of claim 14 wherein the control circuit is further configured to control operation of the oil pump to operate at a rail voltage between 24 and 60 volts.

[c18] 18.The control unit of claim 14 wherein the prescribed is a nominal 24 volts.

[c19] 19.An outboard motor comprising:
an internal combustion engine to provide thrust to propel a watercraft;
an engine component in operable association with internal combustion engine operation, the engine component rated to operate at a rated maximum voltage; and
an engine control unit to control the engine component to operate at a voltage that exceeds the rated maximum voltage.

[c20] 20.The outboard motor of claim 19 further comprising a voltage source to apply voltage to the engine component

at a voltage that exceeds the rated maximum voltage of the engine component.

[c21] 21.The outboard motor of claim 19 wherein the engine control unit includes an engine component drive circuit configured to switch the engine component between ON and OFF states to maintain current through the engine component at a desired amperage.

[c22] 22.The outboard motor of claim 19 wherein the engine control unit is further configured to compare a rail voltage applied to the engine component to a reference voltage and determine switching of the engine component between ON and OFF states therefrom.

[c23] 23.The outboard motor of claim 22 further comprising an engine component drive circuit configured to switch the engine component to an OFF state if a difference between the rail voltage and the reference voltage exceeds a threshold amount.

[c24] 24.The outboard motor of claim 19 wherein the engine component is an oil pump designed to deliver oil to the internal combustion engine and the engine control unit maintains operation of the oil pump at approximately one ampere when the oil pump is operating.

[c25] 25.The outboard motor of claim 24 wherein the oil pump

is rated to operate at a nominal 24 volts.

[c26] 26.The outboard motor of claim 19 further comprising a MOSFET to control switching of the engine component between ON and OFF states.

[c27] 27.The outboard motor of claim 19 wherein the internal combustion engine is configured to operate on a rail voltage between 30 and 60 volts.